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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): M. MOSTAFA

Serial No.: 10/712,370

Filed: November 14, 2003

Title: DATA TRANSMISSION

LETTER CLAIMING RIGHT OF PRIORITY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 18, 2003

Sir:

Under the provisions of 35 USC 119 and 37 CFR 1.55, the applicant(s) hereby claim(s) the right of priority based on:

United Kingdom Patent Application No. 0226571.8
Filed: November 14, 2002

A certified copy of said United Kingdom Patent Application is attached.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

Donald E. Stout
Registration No.: 26,422

DES/rr
Attachment

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

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14NOV02 E763558-2 002716
P01/7700 0.00-0226571.8

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Request for grant of a patent

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1. Your reference — PAT 02402 GB — 0226571.8

2. Patent application number — 14 NOV 2002 — 0226571 8

3. Full name, address and post code of the or of each applicant — Nokia Corporation
Keilalahdentie 4
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Finland

Patents ADP Number 07652217003

If the applicant is a corporate body, give the country/state of its incorporation — Finland

4. Title of the invention — Data Transmission

5. Name of your agent
"Address for service" in the United Kingdom to which all correspondence should be sent — Nokia IPR Department
Nokia House, Summit Avenue
Farnborough, Hants
GU14 ONG
7577638001

Patents ADP number

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and the or each application number

Country	Priority Application Number	Date of Filing

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of Filing

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

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Signature A Walker Date 14-11-02

Andrew Walker

12. Name and daytime telephone number of person to contact in the United Kingdom

Andrew Walker – 01252 867513

Data transmission

This invention relates to data transmission. More specifically, the invention relates to the streaming of media content in a Multimedia Messaging Service.

In mobile communications networks, the term Multimedia Messaging Service (MMS) is commonly used to describe a new approach for transmitting messages having multimedia content. The Multimedia Messaging Service allows messaging between different mobile users and / or between mobile users and the Internet. There is an already agreed solution for providing a Multimedia Messaging Service in 3rd Generation mobile communication networks and its features are described in 3rd Generation Partnership Project (3GPP) Technical Specification (TS) 23.140, "Multimedia Messaging Service (MMS), Functional Description, Stage 2". The Multimedia Messaging Service proposed in 3GPP TS 23.140, employs a store-and-forward approach to message delivery. Multimedia messages are constructed in such a way that the media content (media components), information necessary to describe the media content and addressing information, identifying the intended receiver of the message, are encapsulated together. The multimedia message is then sent from a sending MMS user agent to a recipient Multimedia Messaging Service relay / server, which in turn notifies the intended receiver (recipient MMS user agent) about the availability of the message. Later on, the multimedia message, or selected media components, are downloaded by the recipient MMS user agent terminal and presented to the user of the terminal.

The structure and operation of a typical MMS system as proposed in 3GPP TS 23.140 will next be described with reference to Figures 1 and 2.

Fig. 1 shows an overview of MMS system elements according to 3GPP TS 23.140. The system comprises the following items:

- a plurality of MMS user agents (UAs) 110, each of which is capable of transmitting and receiving multimedia messages;
- a roaming MMS user agent 127;

Acc ss networks 122, 124 and 126 of different types including:

- A second generation mobile telecommunications network 122 such as a GSM phase 2 network;
- A third generation mobile telecommunications network 124 such as a Universal Mobile Telecommunications System (UMTS); and
- A mobile access network 126, for example a wireless-LAN network.
- The Internet (or another Internet Protocol (IP) -network) 130, having an external server 134, such as an e-mail server, and a wired e-mail client 132;
- A Multimedia Messaging Service relay 142 and an MMS server 144 which, in this example, are integrated into a single unit, referred to as a Multimedia Messaging Service Centre (MMSC) 140, but which can alternatively be implemented as separate or distributed entities;
- A message store 150 in connection with the MMS server 144; and
- User databases 160 comprising, for example, user subscription and addressing information.

The collective term Multimedia Messaging Service Environment (MMSE) is used to describe those functional elements that operate together to implement a multimedia messaging service. In Fig. 1, an MMSE is formed by the elements within the oval outlined region.

Referring in further detail to Fig. 1, each MMS user agent 110 connects to the MMS relay 142 through its access network 122, 124. The roaming MMS user agent 127 connects to the MMS relay 142 through the mobile access network 126 and via the Internet 130. The MMS relay is connected to the MMS server 144 and to the user databases 160. Furthermore, the external server 134 and the wired e-mail client 132 are connected to the Internet 130.

Fig. 2 shows an overview of inter-working between different MMSE's according to 3GPP TS 23.140. The communication of multimedia messages takes place between user agents 110A (sender) and 110B (recipient) which reside in two diff rent Multimedia Messaging Service Environments. For simplicity and clarity, the two Multimedia Messaging Service Environments, MMSE A and MMSE B, are

each shown to comprise a single MMS relay, linked to a single MMS server, thus forming two MMSC's 214 and 224. It should be appreciated that in a practical MMSE, the number of MMS relays and servers may be, and typically will be, greater than this. MMSE A and MMSE B may, for example, have different operators, different geographical locations or coverage areas and / or differ in terms of their technical characteristics and capabilities. Furthermore, in the situation where a particular MMSE comprises more than one MMS relay, the method according to the invention can also be applied within the MMSE (intra-MMSE).

In the example shown in Fig. 2, both MMS user agents 110A and 110B are depicted as devices that communicate with their respective MMSE 210, 220 via a radio communication network 212, 222. However, it should be appreciated that either MMSE user agent A or MMSE user agent B, or both of them, could reside in a fixed line network (not shown).

No particular restrictions are placed on the type of media content that may be included in a multimedia message. In general, the media components may be classified as belonging to one of two categories, namely: 1) those suitable for streaming to the recipient user agent and 2) those which are typically not suitable for streaming. Examples of media components that fall within the first category are audio and video clips, while media components typical of the second, non-streamable category include, for example, text and still images. The term "streaming" is generally used to describe the presentation of media content, or a combination of different media types, in a continuous way while the content is being transmitted to a recipient over a data network. Thus, a "stream" is a flow of data enabling the recipient to present some form of continuously evolving information, such as the audio or video clip referred to above. In practice, streaming can be either live, or performed in an on-demand fashion. The term "liv streaming" describes the creation of a media stream from a live source, for example a stream of digital images produced in real time by a video camera, while the term "on-demand streaming" describes the creation of a media stream from, for example, a file comprising encoded (compressed) audio or video data stored

on a server.

The use of streaming in mobile networks is potentially very beneficial. Typically mobile terminals have limited memory and processing power and mobile communication networks may also have limited data transfer rates. Thus, adoption of a streaming approach to media download and presentation can reduce the amount of available memory required by mobile terminals and may also reduce the delay in starting playback of a media component. For these reasons, there has also been interest in the incorporation of streaming into the 3rd generation multimedia messaging service.

In order to download a streamable media component by streaming it is necessary to establish a so-called "streaming session" between the recipient terminal and the source of the media content. To establish a streaming session, the recipient terminal must know certain information about the media content to be streamed. In general, this information may include, but is not limited to, the type of the media content, the format in which it is encoded, the transport mechanism to be used in streaming the content to the recipient and the location (e.g. network address) from which the content is to be downloaded. This information, which the intended recipient must know in advance in order to establish a streaming session, is typically referred to as "Session Description Data" (SDD). As previously explained, according 3GPP TS 23.140, a multimedia message is formed by encapsulating media content, information necessary to describe the media content and addressing information, identifying the intended recipient of the message, into a single message structure. This approach to message construction is inherently incompatible with the streaming download of media content, as there is no way for a recipient MMS user agent to obtain the SDD it requires to establish a streaming session before the multimedia message has been downloaded in its entirety.

For this reason, earlier versions of 3GPP TS 23.140, such as V.3.1.0 (release '99), did not provide support for the streaming download of media content to a recipient MMS user agent. All media components, streamable and non-streamable, were simply delivered to the recipient MMS us r agent and only presented once

downloading of the entire message was complete.

The basic mechanism of Multimedia Message delivery according to 3GPP TS 23.140 V.3.1.0 will now be described in greater detail with reference to Fig. 2. Here it is assumed that MMS user agent A 110A, which has subscribed to the multimedia messaging service provided in Multimedia Messaging Service Environment A 210, wishes to send some media content to MMS user agent B 110B, which has a subscription to the multimedia messaging service provided in MMSE B 220. When initiating the communication of a multimedia message to MMS user agent B, MMS user agent A first selects the media content to be transmitted. For example, the media content may be of a non-streamable type, such as a still image and some associated text, stored in the memory of user agent A, or it may be suitable for streaming, such as an audio or video clip. In either case, according to 3GPP TS 23.140 V.3.1.0, user agent A encapsulates the media content as a multimedia message, comprising the media content itself, information necessary to describe the media content and addressing information, identifying the intended recipient of the message. MMS user agent A then sends the message to MMS relay A through radio network A 212.

On receiving the multimedia message, MMS relay A determines, from the addressing information included with the message, that the intended recipient is not a user agent of MMSE A, but a user agent of MMS relay B and forwards the multimedia message to MMS relay B. Routing of the multimedia message to the correct MMS relay, i.e. that responsible for MMS user agent B is achieved, for example, using standardised mechanisms provided for in the existing 3GPP multimedia messaging solution. On receiving the multimedia message, MMS relay B stores the media content in MMS server B and sends a notification to the intended recipient, MMS user agent B, thereby indicating that a multimedia message has arrived and its content is available to be downloaded from MMS relay B. In response to receiving the notification, MMS user agent B retrieves th media content from (via) the MMS relay B. The retrieval of the media content is initiat d by signalling with MMS relay B.

3GPP TS 23.140, V.4.1.0 (Rel ase 4, Decemb r 2000), included provisions for nabling the streaming download of media content. It proposed a solution in which the SDD, required by a recipient MMS user agent to establish a streaming session, was provided in the notification message sent by the recipient MMS relay. More specifically, according to 3GPP TS 23.140 V.4.1.0, when a recipient MMS relay, such as MMS relay B, receives a multimedia message containing streamable media content, it forms a modified MMS notification message and sends it to the intended recipient user agent to notify it about any streamable multimedia components contained in the multimedia message. The modified notification message contains the SDD necessary to initialise a streaming session between the recipient MMS user agent and an MMS server that has access to the streamable multimedia components.

WO 02/063849 discloses an alternative method for enabling streaming download of media components in a multimedia messaging system, which operates without the need to modify the notification message sent to the recipient MMS user agent. The method proposed in WO 02/063849 forms the basis for the support of streaming in the most recent versions of the 3GPP multimedia messaging standard.

According to the method disclosed in WO 02/063849, a recipient MMS relay examines the multimedia messages it receives and replaces any streamable media components in the messages with descriptors before notifying the recipient user agent about the multimedia message. Each descriptor comprises SDD sufficient to allow the recipient MMS user agent to form a streaming session for downloading a particular one of the streamable media components in the multimedia message. Alternatively, descriptors comprising SDD for more than one streamable component can be used. Advantageously, a descriptor takes the form of a Session Description Protocol (SDP) file, a standard format known from streaming applications in the Internet. WO 02/068349 also mentions the possibility that SDD can be provided by means of a Uniform Resource Identifier (URI) or a Uniform Resource Locator (URL) inserted into the multimedia m ssage in place of a streamable compon nt. In this case, the URI or URL provides information

enabling the recipient MMS user agent to retrieve SDD from a location within a data communication network, for example the MMSE itself or, more generally, the Internet.

In WO 02/068349, after receiving the notification, the recipient MMS user agent requests delivery of the multimedia message, by sending an MMS retrieve request to the recipient MMS relay. The MMS relay then sends an MMS retrieve response comprising the modified multimedia message. On receiving the modified multimedia message, the recipient MMS user agent can present the non-streamable media components and further decide which, if any, of the streamable components are to be retrieved. If the modified message comprises the SDD in the form of an SDP file, the recipient user agent MMS has immediate access to the information it requires to form a streaming session. If the descriptor(s) take the form of URIs or URLs, the recipient user agent must first retrieve the SDD from the location indicated by the URI or URL and can then form a streaming session to retrieve the streamable component in question.

According to a first aspect of the invention there is provided a method for sending multimedia messages in a mobile multimedia messaging service to multimedia messaging user agents, comprising the steps of:

receiving a multimedia message retrieve request for a particular multimedia message from a multimedia messaging user agent; and

responsive to the retrieve request, performing the steps of:

obtaining streaming adaptation information of the user agent that requested the multimedia message;

determining if the multimedia message addressed to a user agent comprises a component that can be streamed to the user agent;

generating, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component;

replacing the streamable component with a descriptor pointing to the session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent; and

establishing a streaming session in accordanc with the session description data with the user agent to deliver the streamable component.

Preferably, the method further comprises receiving a notification informing that the multimedia message is available. Preferably the notification conforms to 3GPP 23.140 MMS specifications.

Furthermore, the method for receiving a multimedia message according to the invention allows the use of a single type of notification message to inform a recipient MMS user agent that a multimedia message is available for download. In other words, a single notification message type may be used regardless of the media content of a particular multimedia message. This has the advantage of simplifying the formation of notification messages and allowing the availability of multimedia messages for download to be indicated in a consistent manner.

Advantageously, Session Description Data (SDD) need not be generated for a particular streamable media component before it is known whether the MMS user agent will actually retrieve the media component in question and the resources of the multimedia messaging system can be spared by only generating the SDD when needed.

Further, the MMS user agent that retrieves the streamable components of a particular multimedia message need not be the same as the MMS user agent to which the original notification was sent. If a user decides to retrieve the streamable components of the multimedia message with a terminal other than the MMS user agent to which the notification message was sent, or with preferences other than the typical ones, it is still possible to establish a streaming session correctly despite possible differences in the streaming-specific capabilities of the terminals.

Advantageously, the streaming adaptation information of the user agent allows generation of the SDD dependent on the properties of and / or preferences related to the terminal that actually retrieves a streamable component of th multimedia message.

Preferably, the streaming adaptation information comprises information on the user agent's capabilities to stream data and / or user preferences relating to streaming.

Preferably, the determination if the multimedia message comprises a component that can be streamed to the user agent takes into account the streaming adaptation information.

Advantageously, using the streaming adaptation information it is possible to identify the media components which the user agent is actually able to stream and which are not excluded by user preferences. Hence, the user agent is able to stream all media components determined as being streamable. Further advantageously, the user preferences may exclude particular media components from being streamed despite their streaming being supported by the capabilities of the user agent. This exclusion can depend on criteria such as media type, size, estimated cost or duration of transfer. In both the aforementioned situations, unnecessary generation of the SDD can be avoided. This results in a reduction of the computational load on the messaging system as not all user agents are able to stream all potentially streamable media components. Additionally, all user agents will not always require streaming of all possibly streamable components.

Preferably, the step of obtaining of the streaming adaptation information takes place on receiving the retrieve request. Advantageously, obtaining the streaming adaptation information on receiving the retrieve request allows the same procedure to be used irrespective of whether there are streamable components and how they should be streamed.

Preferably, the step of obtaining of the streaming adaptation information is based on information contained in the retrieve request. Advantageously, detailed streaming adaptation information or a reference to such detailed streaming adaptation information may be received in, or together with, the retrieve request.

Preferably, the step of obtaining of the streaming adaptation information takes

place aft r rec iving the r trieve request. Advantageously, the obtaining the streaming adaptation information after receiving the retrieve request allows receiving the adaptation information by an entity that also generates the SDD. This allows a great level of flexibility as the provisioning of the adaptation information takes place between the two parties that will be responsible for streaming, resulting in ease of upgrading of streaming in the multimedia messaging service.

Preferably, the step of obtaining of the streaming adaptation information is based on information contained in communication received subsequent to the retrieve request. Advantageously, the streaming adaptation information may be received from the user agent in a communication such as an RTSP describe signal.

Preferably, the step of replacing the streamable component with a descriptor takes place at an MMS relay. Preferably, the step of generating the SDD takes place at an entity other than the MMS relay such as an MMS server.

Advantageously, a recipient MMS relay need not support any session description protocols and need not be capable of understanding in detail the streaming-specific capabilities of the recipient MMS user, as the generation of the Session Description Data is performed by the media server. SDD. These two factors reduce the complexity of the MMS relay implementation compared with MMS implementations in which the MMS relay is required to generate the SDD.

Furthermore, because the recipient MMS relay is not required to generate SDD, it need not necessarily perform extensive manipulation of the message content SDDwhen replacing streamable media components with descriptors. This reduces the expected workload of the MMS relay and may increase the number of recipient MMS user agents that an individual MMS relay can handle. Alternatively message delivery times may be reduced as a result of the lesser workload placed on the recipient MMS relay.

Preferably, the gen ration and provision of SDD is distribut d and is performed by different servers. Advantageously, a dynamically xpandable and flexible system

results, as the requirements f r a Multimedia Messaging Service Centre (combination of on or more MMS relay and one or more MMS server) will be reduced compared to the prior art.

Advantageously, adopting the method of sending a multimedia message according to the invention increases the flexibility of a multimedia messaging system and reduces the requirements placed on MMS relays within the system.

Furthermore, new streaming capabilities can be introduced into the multimedia messaging system without requiring changes to the multimedia messaging relay that is responsible for notification and message delivery. This advantage arises because the generation of SDD can be performed by dedicated multimedia servers (media servers) separate from the multimedia messaging relay. In this way, the multimedia messaging system can be upgraded to use ever more sophisticated streaming protocols. An upgrade to a more sophisticated streaming protocol can be implemented by making the necessary changes to the media server and MMS user agents, while changes to the multimedia messaging relay are not necessarily required.

According to a second aspect of the invention there is provided a method for receiving multimedia messages by a multimedia messaging user agent from a multimedia messaging network in a mobile multimedia messaging service wherein user agents receive multimedia message notifications notifying the presence of multimedia messages and send retrieve requests to subsequently receiv multimedia messages, comprising the steps of:

sending a multimedia message retrieve request to the network for receiving a multimedia message and providing the network with streaming adaptation information after the network has sent a notification for the multimedia message;

receiving from the network a multimedia message transmission corresponding to the multimedia message retrieve request;

obtaining from the received multimedia message transmission a descriptor pointing to a remote location in the network;

obtaining session description data to stablish a streaming session for

retrieving a str amable component from the remote location indicat d by the descriptor in accordance with th streaming adaptation information; and

establishing a streaming session in accordance with the session description data to retrieve a streamable media component.

Advantageously, providing the network with streaming adaptation information after the notification has been sent allows customisation of the SDD so that it is appropriate to the user agent.

Preferably, the streaming adaptation information provides streaming-specific capability information relating to particular user agent terminal or information concerning the streaming preferences of a user of that terminal. Advantageously, by providing the user agent capability information, the SDD can subsequently be generated in the network such that the user agent will be capable of streaming in accordance with the Session Description Data. Advantageously, providing the streaming preference information allows customised generation of Session Description Data so that streaming can be performed in conformance with user preferences.

Preferably, the multimedia message comprises both streamable and non-streamable components. Advantageously, non-streamable components can be immediately presented to the user whilst the streamable components are retrieved separately and presented either separately or together with non-streamable components.

Preferably, the multimedia message is transferred over a wireless communication channel to the user agent. Preferably, the multimedia messaging network is implemented in a cellular radio network such as GSM, UMTS, PDC, IS-95, or CDMA-2000.

Preferably, the SDD contains information determining how a streamable component should be presented. Advantageously, caption texts, control icons, background melodies and / or ex cutable applets relating to the multimedia

message can be provided as non-streamable components and link d to a streamable component or components by the SDD so that the message can be composed at the recipient device in a concentrated manner. Hence, a great degree of design freedom can be obtained to create imposing multimedia messages. This is particularly advantageous in advertisement messages.

According to a third aspect of the invention there is provided a multimedia messaging network entity for sending multimedia messages to multimedia messaging user agents in a mobile multimedia messaging service, comprising:

a port for receiving a multimedia message retrieve request for a particular multimedia message from a multimedia user agent;

means for obtaining streaming adaptation information of the user agent that requested the multimedia message and for determining if the multimedia message addressed to a multimedia user agent comprises a component that can be streamed to the user agent, responsive to receiving the retrieve request;

means for replacing the streamable component with a descriptor pointing to session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent, responsive to determining that the multimedia message comprises a streamable component;

means for generating, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component; and

means for establishing a streaming session in accordance with the session description data with the recipient user agent to deliver the streamable component.

According to a fourth aspect of the invention there is provided a multimedia messaging user agent for receiving multimedia messages from a multimedia messaging network in a mobile multimedia messaging service wherein multimedia message notifications notifying for the presence of multimedia messages are sent to user agents, comprising:

a transmitter for sending a multim dia retrieve request to the network for receiving a multimedia message and for providing the network with streaming

adaptation information after the network has sent a notification for the multimedia message;

a receiver for receiving a multimedia message transmission corresponding to the multimedia message retrieve request;

means for obtaining from the received multimedia message transmission a descriptor pointing to a remote location in the network;

means for obtaining the session description data from the remote location indicated by the descriptor in accordance with the streaming adaptation information; and

means for initiating a streaming session in accordance with the session description data to retrieve a streamable media component.

Preferably, the multimedia messaging user agent is a portable device. Even more preferably, the user agent is a hand portable or wearable device.

Preferably, the multimedia messaging user agent comprises a mobile telephone, a wireless communication enabled PDA device, an electronic book or an electronic newspaper.

Preferably, the user agent is a stand-alone device. Alternatively, the user agent is at least partly implemented by means of an add-on module such as a PC-card or by means of executable program code operable at a communication device.

According to a fifth aspect of the invention there is provided a system comprising a network entity according to the third aspect and a user agent according to the fourth aspect of the invention.

According to a sixth aspect of the invention there is provided a computer program product for controlling multimedia messaging network entity for sending multimedia messages to multimedia messaging user agents in a mobile multimedia messaging service, comprising:

computer executable program code for causing the network entity to receive a multimedia message retrieve request for a particular multimedia message from a multimedia messaging user agent;

computer executabl program code for causing the network entity to obtain streaming adaptation information on the user agent that requ sted the multimedia message responsive to receiving the retrieve request;

computer executable program code for causing the network entity to determine if the multimedia message addressed to a user agent comprises a component that can be streamed to the user agent, responsive to receiving the retrieve request;

computer executable program code for causing the network entity to generate, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component;

computer executable program code for causing the network entity to replace the streamable component with a descriptor pointing to the session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent, responsive to receiving the retrieve request; and

computer executable program code for causing the network entity to establish a streaming session in accordance with the session description data with the user agent to deliver the streamable component.

According to a seventh aspect of the invention there is provided a computer program product for controlling multimedia messaging user agent for receiving multimedia messages from a multimedia messaging network in a mobile multimedia messaging service wherein multimedia message notifications notifying for the presence of multimedia messages are sent to user agents, comprising:

computer executable program code for causing the user agent to send a multimedia retrieve request to the network for receiving a multimedia message and for providing the network with streaming adaptation information after the network has sent a notification for the multimedia message;

computer executable program code for causing the user agent to receive a multimedia message transmission corresponding to the multimedia message retri ve request;

computer executable program code for causing the user agent to obtain

from the received multimedia message transmission a descriptor pointing to a remote location in the network;

computer executable program code for causing the user agent to obtain the session description data from the remote location indicated by the descriptor in accordance with the streaming adaptation information; and

computer executable program code for causing the user agent to establish a streaming session in accordance with the session description data to retrieve a streamable media component.

It should be appreciated that the embodiments of any one aspect may produce advantages when combined with other aspects of the invention and that they can be combined where applicable, even though not all embodiments are expressly written after all aspects.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows an overview of MMS system elements according to 3GPP TS 23.140, v. 4.1.0;

Fig. 2 shows an overview of inter-working MMS system elements according to 3GPP TS 23.140, v. 4.1.0;

Fig. 3 shows the flow of signalling on receiving a multimedia message, according to a preferred embodiment of the present invention;

Fig. 4 shows a flow chart describing the operation of an MMS relay / server, according to a preferred embodiment of the present invention; and

Fig. 5 shows a block diagram of the structure of an MMS user agent, according to the preferred embodiment of the present invention.

Figures 1 to 2 were described in the foregoing to illustrate the prior art. They also form a framework within which the present invention can be implemented.

The operation of a multimedia messaging system according to the invention will

now be described in an exemplary manner. In the following description, it will b assumed that the multimedia messaging system is implemented in a 3rd generation mobile communication system. It should be appreciated that the MMS system according to the invention may also be implemented in various other mobile communications systems based on different technologies and communication protocols. For example, an MMS system according to the invention may also be provided in a GSM-based mobile communication network. If the GSM network is implemented according to the requirements of the General Packet Radio System (GPRS), the details of signalling between the elements of the MMS system and the mobile communication network will correspond substantially with the description provided below. In mobile communication systems based on different technologies and communication protocols, interaction of the MMS system and the underlying communication network may be affected in an equivalent manner, although the exact details of the signalling required may differ from those presented in the following example.

Analogous to the previously presented description of prior art, the situation will be examined in which MMS user agent A in Multimedia Messaging Service Environment A (MMSE A), sends a multimedia message to MMS user agent B, which is resident in Multimedia Messaging Service Environment B (MMSE B).

When initiating the communication of a multimedia message to MMS user agent B, MMS user agent A first selects the media content to be transmitted. As previously described, the media content may be of a non-streamable type, such as a still image and some associated text, stored in the memory of user agent A, or it may be of a type suitable for streaming, such as an audio or video clip, or a combination of both non-streamable and streamable media content types. Some of the media contents may also take the form of URIs or URLs indicating network locations from where particular media components may be obtained.

MMS user agent A encapsulates the media content as a multimedia message, comprising the media content itself, information n cessary to d scrib the media content and addressing information, identifying th intended recipient of the

messag . It th n sends the message to MMS relay A through radio network A. On receiving the multimedia message, MMS relay A determines, from the addressing information included with the message, that the intended recipient is not a user agent of MMSE A, but a user agent of MMS relay B in MMSE B and forwards the multimedia message to MMS relay B.

The signalling related to delivery of the multimedia message to MMS user agent B according to the preferred embodiment of the present invention will now be described with reference to Fig. 3. When the multimedia message addressed to MMS user agent B arrives at MMS relay B, it stores the media content of the message in MMS server B and sends an MMS notification signal 310 to recipient MMS user agent B. Responsive to receipt of the notification signal, MMS user agent B replies with an MMS notification response signal 311. Later, or optionally as part of signal 311, MMS user agent B sends an MMS retrieve request signal 312 to MMS relay B. MMS relay B responds by sending a modified multimedia message, comprising non-streamable media components and descriptors representing any streamable media components, in an MMS retrieve response 313. Responsive to receiving the MMS retrieve response 313, MMS user agent B sends an MMS acknowledgement signal 314 to MMS relay B. According to the preferred embodiment of the present invention, the descriptors used to represent streamable media components do not themselves provide Session Description Data (SDD) to be used by MMS user agent B in establishing a streaming session. Instead, they take the form of pointers, for example URI's or URL's to locations where SDD can be obtained.

Using the descriptors, MMS user agent B can invoke a streaming process to download the streamable media components one by one. The streaming process to download a particular media component is initiated, controlled and terminated by exchanging signals 315 to 323, as illustrated in Fig. 3. In the preferred embodiment of the invention signals 315, 316, 317, 318, 320, 321 and 322 are implemented using the Real-Time Streaming Protocol (RTSP). In an alternative embodiment of the invention the Hypertext Transport Protocol (HTTP) is used inst ad of RTSP to provide thes signals. Two or more streaming process s can

take place at the same time so that th recipient MMS user agent can play or present two or more streamable media components simultaneously. In this case signals 315 to 323 are exchanged for each streamable media component. Typically, the playing of the streamable media components is synchronised by means of commonly used protocols such as Synchronised Multimedia Integration Language (SMIL) definitions provided together with the SDD.

To enable the streaming process for a certain streamable media component represented by a particular descriptor, MMS user agent B requests SDD relating to the media component from MMS server B. In Fig. 4, this request is represented by signal 315 and according to the preferred embodiment of the invention, it is made using a Real-Time Streaming Protocol (RTSP) DESCRIBE method that identifies the streamable media component in question. In response to the RTSP DESCRIBE method signalling, MMS server B provides a response signal 316 containing the SDD.

In the preferred embodiment of the invention, signal 315 is also used to inform MMS server B about capabilities of MMS user agent B. This forms an association between the streamable media component requested in signal 315 and the recipient MMS user agent requesting the media component. It further allows the multimedia messaging system to create the SDD required by MMS user agent B to form a streaming session with MMS server B at the time a streaming session is actually being initiated. As a result, the SDD is only created when needed. It also follows that if a particular streamable media component is not retrieved for some reason, no SDD is created for that component. Furthermore, since the SDD is created only at a stage substantially immediately prior to or during establishment of a streaming session to download the media component, MMS server B can create the SDD so that it is tailored specifically for the recipient MMS user agent. This means that the user can stream a particular streamable component to an MMS user agent other than that which received the MMS notification and / or th MMS retrieve response 313. Although the user may have changed the recipient MMS user agent, an appropriate streaming session may still be established and the streamable component will b r c ived in a format suitabl for the equipment

used.

Advantageously, the capability information provided to MMS server B is obtained from a user equipment capability database 160 that contains information about the technical capabilities of different MMS user agents and / or user preferences concerning different MMS subscribers. In this case, signal 315 is typically formed in accordance with 3GPP Technical Specification 26.234 Version 5.1.0 section A.4. Accordingly, MMS user agent B includes one or several Uniform Resource Locators (URLs) in signal 315. These URLs point to locations in one or several user databases 160 from where MMS server B can retrieve capability profiles or streaming adaptation information, that is, information describing device capabilities and / or user preferences. This list of URLs is encapsulated in RTSP protocol data units using additional header field(s) and transmitted from MMS user agent B to MMS server in the RTSP DESCRIBE method signalling.

Alternatively, signal 315 may contain all the necessary capability and / or user preference information for MMS server B so that MMS server B can autonomously generate the SDD suitable for the recipient MMS user agent.

Advantageously, the capability information relating to a recipient MMS user agent includes at least information about the streaming-specific capabilities of the MMS user agent. Alternatively, the capability information may be more comprehensive including, for example, information relating to the display or audio reproduction capabilities of the MMS user agent.

In response to signal 315, MMS server B forms SDD taking into account the capabilities of the recipient MMS user agent, as described above, and replies by sending the SDD to MMS user agent B, in signal 316, for example in the form of a Session Description Protocol (SDP) file. Using the SDP file, MMS user agent B then sends an RTSP SETUP signal 317 to MMS server B in order to initialise a streaming session. MMS server B responds by sending an RTSP SETUP response signal 318 to MMS user agent B.

After having successfully initialis d a streaming session with MMS server B using the RSTP SETUP method, MMS user agent B starts streaming th media component from MMS server B. In the present example, in which the MMS system is implemented in a 3rd generation mobile communication network, it is first necessary to activate a secondary Packet Data Protocol (PDP) context. Activation of the secondary PDP context enables the transport of data packets containing the media content from MMS server B to MMS user agent B. In order to set up the secondary PDP context MMS user agent B signals 319 with a Serving General packet radio service Support Node (SGSN) of the mobile communications network. Activation of the secondary PDP context and its use in delivery of the media component using packet based communication is conducted in a manner known from 3rd generation / GPRS specifications. In embodiments of the invention implemented in mobile communication systems based on different communication technologies and / or protocols, alternative to GRPS, other packet or circuit switched data services can be employed.

Following activation of the secondary PDP context, MMS user agent B starts streaming the media component by sending RTSP PLAY signalling 320 to MMS server B. The streamable component is then streamed 321 from MMS server B to MMS user agent B using the Internet Protocol (IP) / User Datagram Protocol (UDP) / Real-time Transport Protocol (RTP).

After streaming of the media component has been completed, MMS user agent B terminates the streaming session by performing RTSP TEARDOWN method signalling 322 with MMS server B. MMS user agent B next deactivates the secondary PDP context, as it is no longer needed to transfer the media component. Deactivation of the secondary PDP context is affected by signalling 323 with the SGSN (see Fig. 4).

As in the present MMS standard and as described in the aforementioned WO 02/068349, SDD is provided to the recipient MMS user agent before it can start down-streaming a streamable media component. Howev r, th SDD is not embedded in the multimedia m ssage instead of a streamable component.

According to the present inventi n, only a brief streaming indication is provided for each str amable component. The brief streaming indication contains information that enables the recipient to obtain the SDD it requires to initiate a streaming session with the server where the streamable content is stored. In the preferred embodiment of the invention, as described above, the brief streaming indication takes the form of a pointer (such as a Uniform Resource Locator, URL) to a location where the SDD may be obtained. Advantageously, the provision of the brief streaming indication and its inclusion in the multimedia message requires the recipient MMS relay to perform only a few operations. The brief streaming indication typically specifies an access type to use, such as RTSP or HTTP, an address of the server such as "mediaserver.com" and the identification of the content such as "/news/video24112002_123456".

It is advantageous to arrange the multimedia message such that the descriptor(s) representative of streamable media components are delivered in the early part of the multimedia message so that the streaming session(s) can be initiated as soon as possible, after downloading of a multimedia message has commenced.

Furthermore, according to the invention, the SDD is only generated on or after sending of the MMS retrieve request 312 by the recipient MMS user agent, according to the streaming-specific capabilities of the particular User Equipment (UE) that is used as a streaming terminal.

There are many ways to retrieve the SDD. In addition to the RTSP DESCRIBE method, illustrated in connection with the preferred embodiment of the invention, other protocols such as HTTP GET or electronic mail (E-mail) can be used.

As described above, the SDD is arranged in form of a session description file, such as a Session Description Protocol (SDP) file, which is a widely used session description file type. The session description file provides a description of the presentation for a particular streamable media component or components and allows the recipient MMS user agent to accomplish media initialisation for the str aming process. SDP has a registered Internet Assigned Numbers Authority

(IANA) Multi-purpose Internet Mail Extensions (MIME) type.

Advantageously, the session description file contains the following data: a protocol version, information about the owner and / or creator of the media content, a session identifier, a session name and attributes, session information, an originator identifier, such as the e-mail address or phone number of the sender of the multimedia message, connection information, bandwidth information, different time-related information, and a title and attribute for each media component described by the session description file. The session description file may further comprise some cryptographic information, such as a Message Authentication Code (MAC), a cryptographic checksum for checking the validity of the content, or a challenge for allowing the recipient MMS user agent to generate a session key to be used for decrypting or validating the content.

In alternative embodiments, other forms of files are used for this purpose. TEXT files and files compliant with the Multimedia and Hypermedia Information Coding Experts Group (MHEG) ISO/IEC standard 13522 may also be used for this purpose. All these file types have a registered MIME type.

Generation of SDD dependent on the capabilities of the UE actually used to down-stream a streamable media component provides the MMS system with a great degree of flexibility, since MMS server B can adapt to the UE used each time a streamable component is to be down-streamed.

The entire multimedia message can be uploaded to the recipient MMSC 224 either by streaming or by any other appropriate method. In the preferred embodiment of the present invention, use of streaming in downloading media content to a given recipient MMS user agent is independent of the manner in which the content was uploaded to the MMS relay B 224.

Fig. 4 shows a flow chart describing the operation of MMS relay B according to the preferred embodiment of the present invention. The operation starts from block 401. In block 402, MMS relay B receives a multimedia message. In block 403,

MMS relay B attempts to notify the recipient user agent (MMS user agent B) with MMS notification 310 that the multimedia message is now availabl to for delivery. MMS relay B then checks in block 404 if an MMS notification response 311 has been received, acknowledging the receipt of the MMS notification 310. If the MMS notification response 311 has been received, the operation proceeds to block 407, otherwise it is checked in block 405 if the MMS notification 310 has expired. If yes, the operation returns to block 402 via an optional block 406 where the multimedia message is cleared. Instead of clearing the multimedia message at block 406, MMS relay B may erase the multimedia message at a later stage, for example when more storage capacity is needed or when the multimedia message reaches a predetermined age. If the multimedia message has not expired at block 407, MMS relay B again attempts to notify the recipient user agent at block 403. The loop including blocks 403, 404 and 405 is repeated until either the MMS notification 310 expires or an MMS notification response 311 is received. Typically, expiry of the MMS notification is a condition depending on a time limit and / or a number of attempts. For example, MMS relay B may send the MMS notification 310 up to ten times within an interval of up to 60 minutes so that the recipient user agent will be likely to succeed in receiving the MMS notification 310.

The MMS retrieve request 312 may be integrated with the notification response 311, if the MMS retrieve request message 312 would in any case be transmitted shortly (for example, 1, 5 or 10 minutes) after the MMS notification acknowledgement 311, or if automatic downloading of incoming multimedia messages has been selected.

Blocks 404 and 405 may further check if a cancellation of the multimedia message has been received from the originator of the message or from an MMS operator acting as a moderator. It the multimedia message has been cancelled, the operation returns to block 402 via block 406 and the multimedia message is cleared.

Aft r successfully notifying the recipi nt MMS user agent about the multimedia messag , MMS relay B starts polling (blocks 407 and 408) the reception of an

MMS retrieve request messag 312 until expiry of conditions relating to delivery the message are fulfilled. These conditions typically includ an expiry time and / or a date after which the multimedia message will no longer be maintained. If the expiry conditions are fulfilled the operation jumps from block 408 to block 406 and the multimedia message is cleared.

Next, in block 409, MMS relay B checks if the multimedia message contains any components that can be made available to the recipient MMS user agent by streaming. If yes, the media components that can be made available by streaming are replaced with descriptors and the procedure continues to block 410.

In block 410, MMS relay B modifies the multimedia message by replacing the media components of the multimedia message that can be streamed to the recipient user agent with respective descriptors. It further stores the streamable components, in an MMS server (MMS server B) associated with the MMS relay B 224. MMS server B may be integrated with the MMS relay B or may be a different physical entity, in which case the MMS relay B sends the streamable components to the separate MMS server for storage.

The determination of streamability in block 409 may depend on various criteria, such as the capabilities of MMS server B, the capabilities of the recipient MMS user agent received in the MMS retrieve request 312 and the type of the media content (audio, video etc.). MMS relay B may maintain a pre-defined list of content types which are streamable for use in determination of streamability. Optionally, the recipient MMS user agent can indicate the content types it is able to stream in the MMS retrieve request signal 312. Alternatively, MMS server B can be arranged to make the determination of streamability at block 409. In this alternative implementation, MMS relay B need not be informed of the capabilities of MMS server B.

According to the invention, an MMS system can be constructed with numerous interconnected MMS relays so that the capabilities of the various MMS servers associated with the relays can b used to their full advantag . More specifically, If

a multimedia message comprising on or more potentially streamable media components is delivered to a particular MMS relay whose associated MMS server is not streaming capable, storage of the multimedia message can be transferred to a streaming capable MMS server associated with another MMS relay in the MMS system. When a new MMS server is added into an MMS system, or the capabilities of a particular MMS server are enhanced, the system automatically starts making use of the enhanced features thereby provided to the system.

It should be appreciated that since the question of streamability is not examined by MMS relay B before receiving the MMS retrieve request 312, the user who receives notification of the multimedia message may freely choose to use any UE as the recipient MMS user agent for retrieving the multimedia message. Thus, the capabilities of the UE actually used to retrieve a particular media component of a multimedia message can be taken into account both in the determination of whether that component may be downloaded by streaming and in the generation of the SDD. If, for example, the recipient user agent is changed from a device with very limited software and hardware resources to another with superior capabilities, MMS relay B can adapt to the change. Thus, the change in user equipment may affect the decision made by MMS relay B concerning the streamability of a particular potentially streamable media component. In the example just given, it is quite likely that exchanging an MMS user agent with lower specifications for one having higher specifications will enable more potentially streamable components to be actually downloaded by streaming.

Alternatively, instead of performing the operations associated with blocks 409 and 410 entirely in MMS relay B, these tasks may be performed by MMS server B, More specifically, the system can be implemented so that MMS server B determines which media components are streamable and replaces these components with descriptors. This is advantageous since it further moves streaming related intelligence from MMS relay B to the MMS server B. Furthermore, the streamability of media components may not only depend on the capabilities and / or preferences of the recipient MMS us r agent, but also on th capabilities and / or preferences of MMS server B. Hence, MMS relay B can

substantially avoid processing related to streaming.

In block 411, after or substantially simultaneously with the storage of the streamable components, MMS server B delivers the modified multimedia message comprising non-streamable media components and descriptors representing streamable components to the recipient user agent.

At block 412 MMS relay B then receives an MMS acknowledge signal 314 from recipient MMS user agent B. The procedure then continues to block 413, where the recipient MMS UA sends the signal 315 to MMS server B, requesting provision of the SDD relating to a particular streamable media component. As described in the foregoing, the recipient MMS user agent provides MMS relay B with capability information, thereby making an association between the capabilities of the recipient MMS user agent and the particular streamable media component to be downloaded. Having the capability association, MMS server B can generate the SDD taking into account the capabilities of the recipient MMS user agent. In an alternative embodiment of the invention, the recipient MMS UA 110B sends signal 315 to MMS server 224 before sending acknowledgement signal 314 to MMS relay B 224.

In block 414, MMS server B next generates the SDD and sends it in signal 316 to the recipient user agent that requested delivery of the media component, typically in form of an SDP file.

After providing the SDD to the recipient MMS user agent, MMS server B initialises a streaming session, starts streaming the data, and tears down the streaming session when streaming of the media component is complete. These steps are repeated for each streamable component requested. As explained in the foregoing, more than one streaming process can be performed in parallel so that the recipient MMS user agent can present two or more streams simultaneously. Advantageously, in this case, RTSP SETUP signalling is completed for each streamable component to be delivered before streaming of th media components is actually started by issuing the RTSP PLAY method signalling. Alternatively,

where simultaneous presentation of more than one streamable media component is not required, the steps of initialising a streaming session, streaming the data for a particular media component and tearing down the streaming session are performed consecutively for each streamable media component requested by the recipient user agent.

After all the streamable components and non-streamable components are delivered, the procedure of delivering the multimedia message ends at block 416. Typically, an MMS relay and an MMS server are implemented as a server computer controlled by a computer program, which enables the MMS relay and MMS server to operate according to the aforementioned steps. In a manner typical of such computer-based implementations, the MMS relay and MMS server are able to multitask, continuously monitoring incoming messages and processing them so that the MMS relay and MMS server can serve numerous recipient MMS user agents simultaneously. It should also be appreciated that the MMS relay and MMS server may simultaneously be involved in delivering more than one multimedia messages addressed to particular recipient user agent. In this case, the MMS relay and MMS server establish two or more parallel processes according to Fig. 4 for a single MMS user agent, so that the processing of different, simultaneously pending, multimedia messages is in largely independent, particularly with regard to the reception and notification steps 402 to 408.

Whilst typically the same MMS server, or server, may store all the components of a particular multimedia message, some of the components may be distributed on different servers. For example, a streamable component may be stored on a particular content provider's own MMS server and in this case the pointer to such a component would refer to a different server than that storing other streamable or non-streamable components.

Fig. 5 shows the structure of an MMS user agent according to a preferred embodiment of the present invention in which the MMS user agent is implemented in a wireless communication device. A microprocessor µP controls the blocks responsible for the MMS user agent's various functions. These functional blocks

compris a random access memory RAM, a radio frequency block RF, a read only memory ROM, an input / output port I/O for xternal connections, a user int rface UI, having an audio system SND and a display DPL for presenting multimedia messages and a keyboard KBD for receiving data and commands from a user. The microprocessor's operating instructions, that is program code for implementing the MMS user agent's basic functions are stored in advance, for example during the manufacturing process, in the ROM. In accordance with its program, the microprocessor uses the RF block for transmitting and receiving messages on a radio path. The microprocessor monitors the state of the user interface UI and controls the MMS user agent according to the program code. On receiving a multimedia message, the microprocessor µP examines the message for a brief streaming indicator or descriptor representing a streamable multimedia component. If it finds such a descriptor, it will cause operation in compliance with steps 413 to 415 of Fig. 4.

Typically, the recipient MMS user agent sets up streaming sessions immediately after receiving SDD. Alternatively, the recipient MMS user agent can store the SDD in its memory for use at some later time to initiate a streaming session. In this case, there will be a substantial delay between reception of the SDD and starting the down-streaming of a particular streamable media component.

If a particular multimedia component is of a type not supported by the MMS user agent itself, the microprocessor may control the input / output port I/O to forward such a component to an external device that supports that type of multimedia component. Such an external device may be a personal computer, typically a laptop computer. This also provides the advantage of allowing use of enhanced user interface and sound capabilities, if the external device provides such facilities. The input / output port may be an infrared port, a wired port, or a Low Power Radio Frequency connection port such as a Bluetooth port. When it is necessary to transfer presentation of a potentially streamable multimedia component to an external device, the capability parameters provided to MMS server B preferably correspond to the capabilities of th external device. Furthermor , on this case, the SDD received from MMS server B is passed to the external device to enable

that device to establish a streaming session with MMS sever B, either via the MMS user agent or via another route, such as fixed Internet access.

Preferably, multimedia components of excessive quality are down-converted to a lower, but sufficient quality level, such that their transmission is faster and they can be readily used by the recipient user agent without any further conversion or manipulation before presentation to the user. Similarly, multimedia components may be converted from one media format to another, such that the result conforms to the capabilities and / or preferences of the recipient user agent. The conversion can be made either beforehand or on / during transmission of the MMS retrieve response.

Particular implementations and embodiments of the invention have been described. It is clear to a person skilled in the art that the invention is not restricted to details of the embodiments presented above, but that it can be implemented in other embodiments using equivalent means without deviating from the characteristics of the invention. The scope of the invention is only restricted by the attached patent claims.

Claims

1. A method for sending multimedia messages in a mobil multim dia messaging service to multimedia messaging user agents, comprising the steps of:

receiving a multimedia message retrieve request for a particular multimedia message from a multimedia messaging user agent; and

responsive to the retrieve request, perfoming the steps of:

obtaining streaming adaptation information of the user agent that requested the multimedia message;

determining if the multimedia message addressed to a user agent comprises a component that can be streamed to the user agent;

generating, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component;

replacing the streamable component with a descriptor pointing to the session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent; and

establishing a streaming session in accordance with the session description data with the user agent to deliver the streamable component.

2. A method according to claim 1, wherein the streaming adaptation information comprises information on the user agent's capabilities to stream data and / or user preferences relating to streaming.

3. A method according to claim 1 or 2, wherein the determination if the multimedia message comprises streamable components takes into account the streaming adaptation information.

4. A method according to any of the preceding claims, wherein the obtaining of the streaming adaptation information is based on information contained in the retrieve request.

5. A method according to any of the prec ding claims, wherein the obtaining of the streaming adaptation information is based on information contained in

communication receiv d subsequent to the retrieve request.

6. A method according to any of the preceding claims, wherein the step of replacing the streamable component with a descriptor takes place at a multimedia messaging relay.

7. A method according to claim 6, wherein the step of generating the session description data takes place at an entity other than the multimedia messaging relay.

8. A method for receiving multimedia messages by a multimedia messaging user agent from a multimedia messaging network in a mobile multimedia messaging service wherein user agents receive multimedia message notifications notifying the presence of multimedia messages and send retrieve requests to subsequently receive multimedia messages, comprising the steps of:

sending a multimedia message retrieve request to the network for receiving a multimedia message and providing the network with streaming adaptation information after the network has sent a notification for the multimedia message;

receiving from the network a multimedia message transmission corresponding to the multimedia message retrieve request;

obtaining from the received multimedia message transmission a descriptor pointing to a remote location in the network;

obtaining session description data to establish a streaming session for retrieving a streamable component from the remote location indicated by the descriptor in accordance with the streaming adaptation information; and

establishing a streaming session in accordance with the session description data to retrieve a streamable media component.

9. A method according to claim 8, wherein the streaming adaptation information provides user agent capability information or streaming preference information.

10. A method according to any of the preceding claims, wherein the session description data comprises information necessary to establish a streaming

session for streaming of the streamabl component.

11. A method according to any of the preceding claims, wherein the multimedia message is transferred over a wireless communication channel to the user agent.

12. A multimedia messaging network entity for sending multimedia messages to multimedia messaging user agents in a mobile multimedia messaging service, comprising:

a port for receiving a multimedia message retrieve request for a particular multimedia message from a multimedia user agent;

means for obtaining streaming adaptation information of the user agent that requested the multimedia message and for determining if the multimedia message addressed to a multimedia user agent comprises a component that can be streamed to the user agent, responsive to receiving the retrieve request;

means for replacing the streamable component with a descriptor pointing to session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent, responsive to determining that the multimedia message comprises a streamable component;

means for generating, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component; and

means for establishing a streaming session in accordance with the session description data with the recipient user agent to deliver the streamable component.

13. A multimedia messaging user agent for receiving multimedia messages from a multimedia messaging network in a mobile multimedia messaging service wherein multimedia message notifications notifying for the presence of multimedia messages are sent to user agents, comprising:

a transmitter for sending a multimedia retrieve request to the network for receiving a multim dia message and for providing the network with streaming adaptation information after the network has sent a notification for th multimedia

messag ;

a receiver for receiving a multimedia message transmission corresponding to the multimedia message retrieve request;

means for obtaining from the received multimedia message transmission a descriptor pointing to a remote location in the network;

means for obtaining the session description data from the remote location indicated by the descriptor in accordance with the streaming adaptation information; and

means for initiating a streaming session in accordance with the session description data to retrieve a streamable media component.

14. A mobile multimedia messaging service system comprising a multimedia messaging network for processing multimedia messages addressed to a plurality of multimedia messaging user agents and a plurality of user agents, comprising:

means for delivering a multimedia message retrieve request from the user agent to the server;

means located in the network for determining if the multimedia message addressed to the user agent comprises a component that can be streamed to the user agent requesting the retrieval of the multimedia message;

means located in the network for replacing a streamable component in the multimedia message with a descriptor representing the streamable component and pointing to session description data according to which a streaming session can be established for delivery of the streamable component;

means located in the network for delivering the multimedia message to the user agent responsive to the multimedia message retrieve request;

means located in the user agent for separating from the multimedia message transmission a descriptor pointing to a remote location in the network;

user agent means for contacting the network according to the descriptor;

means located in the network for obtaining streaming adaptation information on the user agent responsive to receiving the multimedia message retrieve request;

means located in the network for generating session description data

necessary to establish a streaming session for delivering the streamable component according to the streaming adaptation information;

means for establishing a streaming session between the user agent and the network using the session description data in order to deliver the streamable media component.

15. A computer program product for controlling multimedia messaging network entity for sending multimedia messages to multimedia messaging user agents in a mobile multimedia messaging service, comprising:

computer executable program code for causing the network entity to receive a multimedia message retrieve request for a particular multimedia message from a multimedia messaging user agent;

computer executable program code for causing the network entity to obtain streaming adaptation information on the user agent that requested the multimedia message responsive to receiving the retrieve request;

computer executable program code for causing the network entity to determine if the multimedia message addressed to a user agent comprises a component that can be streamed to the user agent, responsive to receiving the retrieve request;

computer executable program code for causing the network entity to generate, according to the adaptation information, session description data to establish a streaming session for delivering the streamable component;

computer executable program code for causing the network entity to replace the streamable component with a descriptor pointing to the session description data for the streamable component and sending the multimedia message with the descriptor replacing the streamable component to the user agent, responsive to receiving the retrieve request; and

computer executable program code for causing the network entity to establish a streaming session in accordance with the session description data with the user agent to deliver the streamable component.

16. A computer program product for controlling multimedia messaging user agent

for receiving multimedia messages from a multimedia messaging network in a mobile multimedia messaging service wherein multimedia message notifications notifying for the presence of multimedia messages are sent to user agents, comprising:

computer executable program code for causing the user agent to send a multimedia retrieve request to the network for receiving a multimedia message and for providing the network with streaming adaptation information after the network has sent a notification for the multimedia message;

computer executable program code for causing the user agent to receive a multimedia message transmission corresponding to the multimedia message retrieve request;

computer executable program code for causing the user agent to obtain from the received multimedia message transmission a descriptor pointing to a remote location in the network;

computer executable program code for causing the user agent to obtain the session description data from the remote location indicated by the descriptor in accordance with the streaming adaptation information; and

computer executable program code for causing the user agent to establish a streaming session in accordance with the session description data to retrieve a streamable media component.

17. A method substantially as hereinbefore described with reference to the accompanying drawings.

18. An apparatus substantially as hereinbefore described with reference to the accompanying drawings.

19. A system substantially as hereinbefore described with reference to the accompanying drawings.

Abstract

Data transmission

A multimedia messaging method and system, wherein the same multimedia message can be used to encapsulate both non-streamable media components and descriptors relating to streamable media components. A recipient extracts the descriptors from the multimedia message, contacts a server holding the streamable components and provides the server with its capability data. The server accordingly creates and sends back session description data. The recipient then initiates streaming sessions according to the session description data.

Fig. 3.

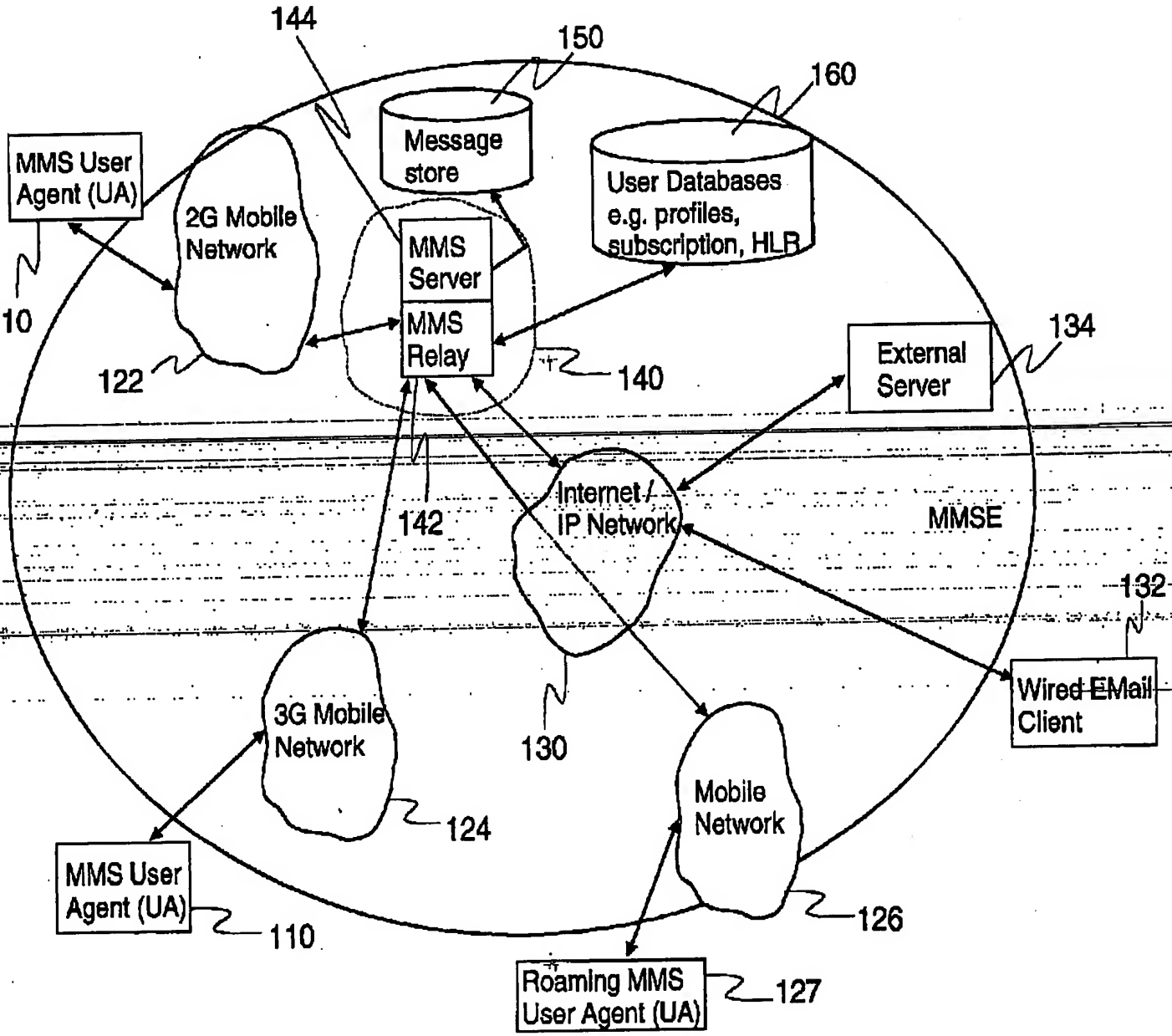

Fig. 1

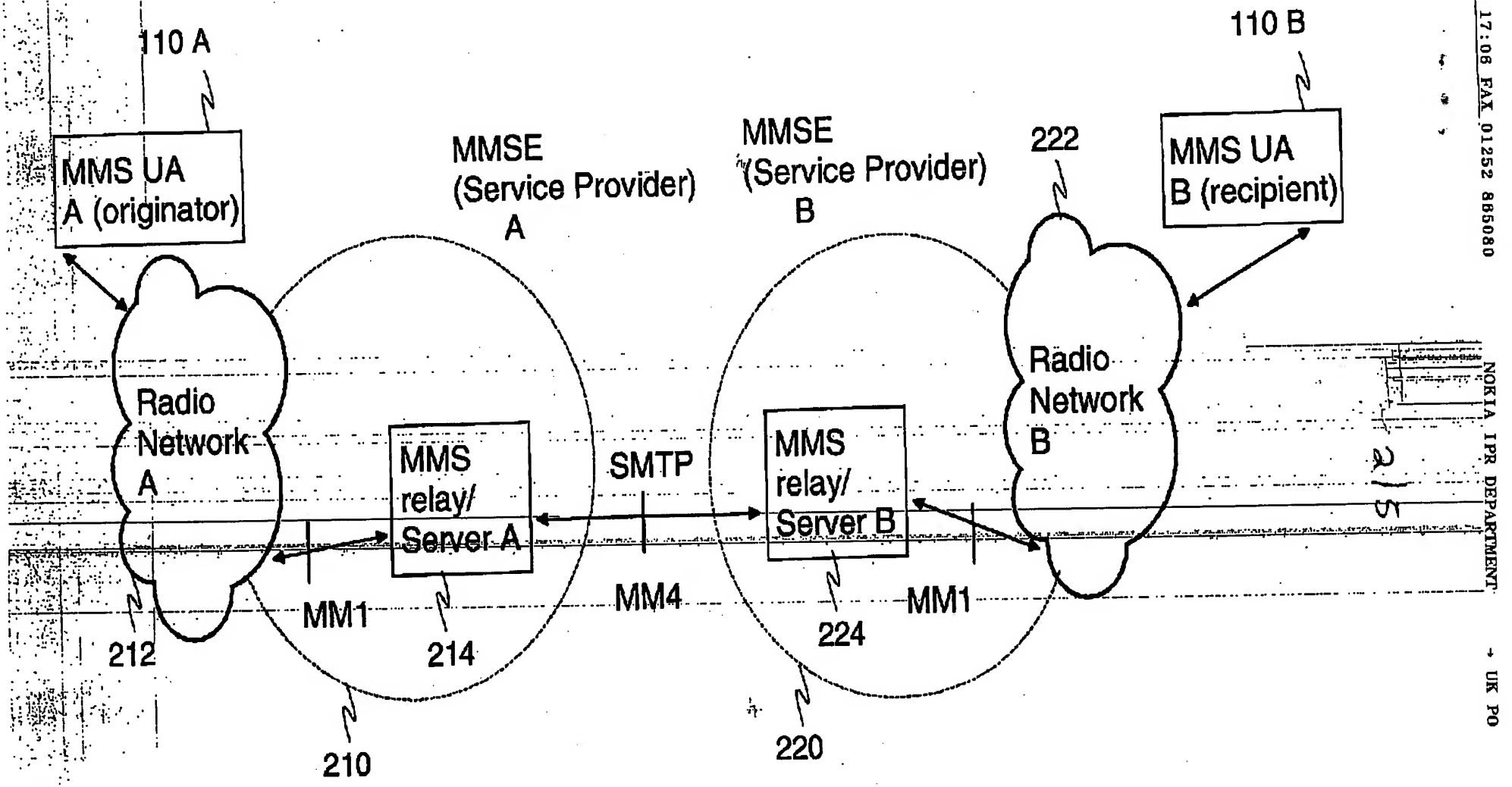

Fig. 2

3/5

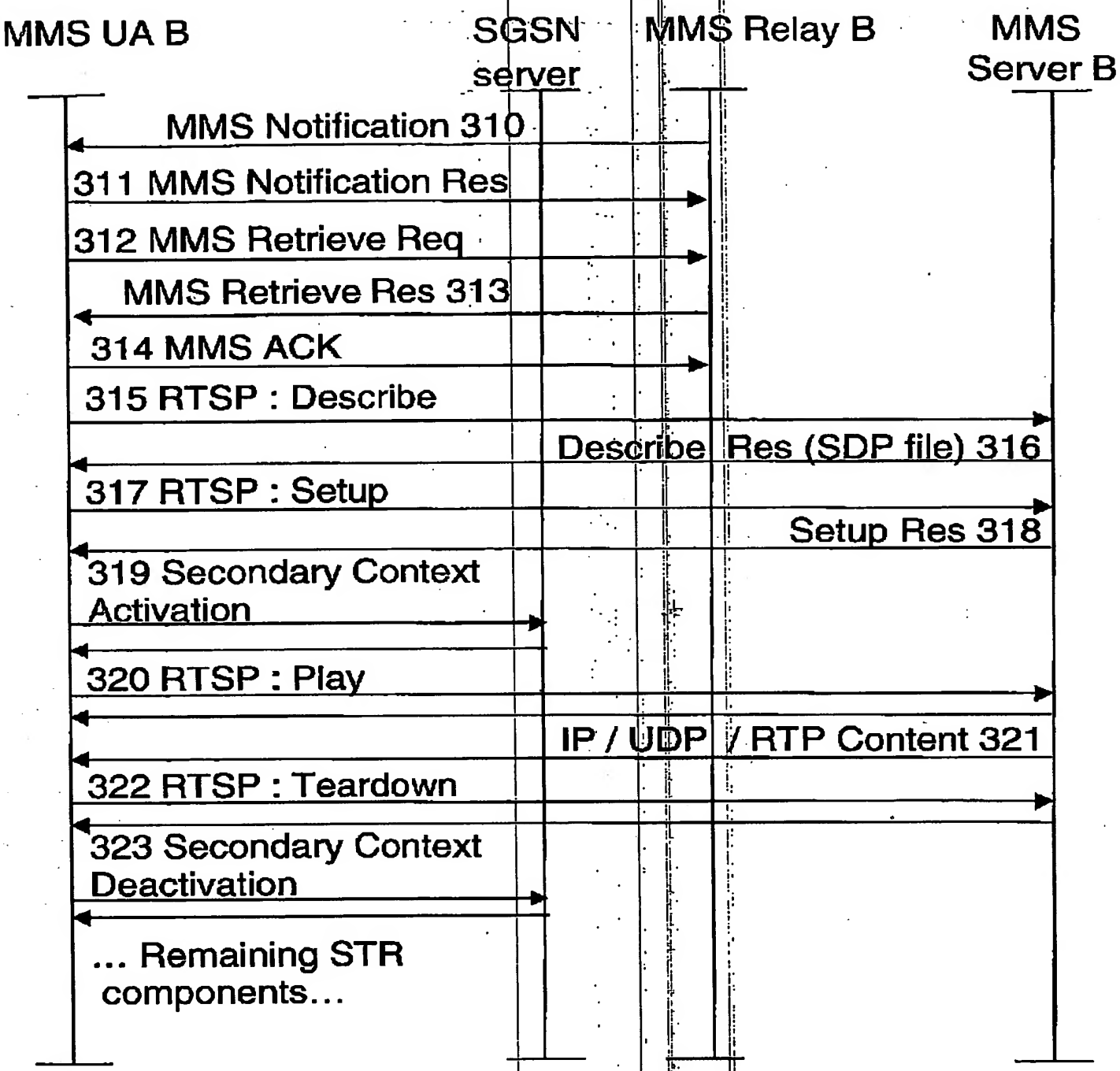
MMS UA B
SGSN server
MMS Relay B
MMS Server B
MMS Notification 310
311 MMS Notification Res
312 MMS Retrieve Req
MMS Retrieve Res 313
314 MMS ACK
315 RTSP : Describe
Describe Res (SDP file) 316
317 RTSP : Setup
Setup Res 318
319 Secondary Context Activation
320 RTSP : Play
IP / UDP / RTP Content 321
322 RTSP : Teardown
323 Secondary Context Deactivation
... Remaining STR components...

Fig. 3

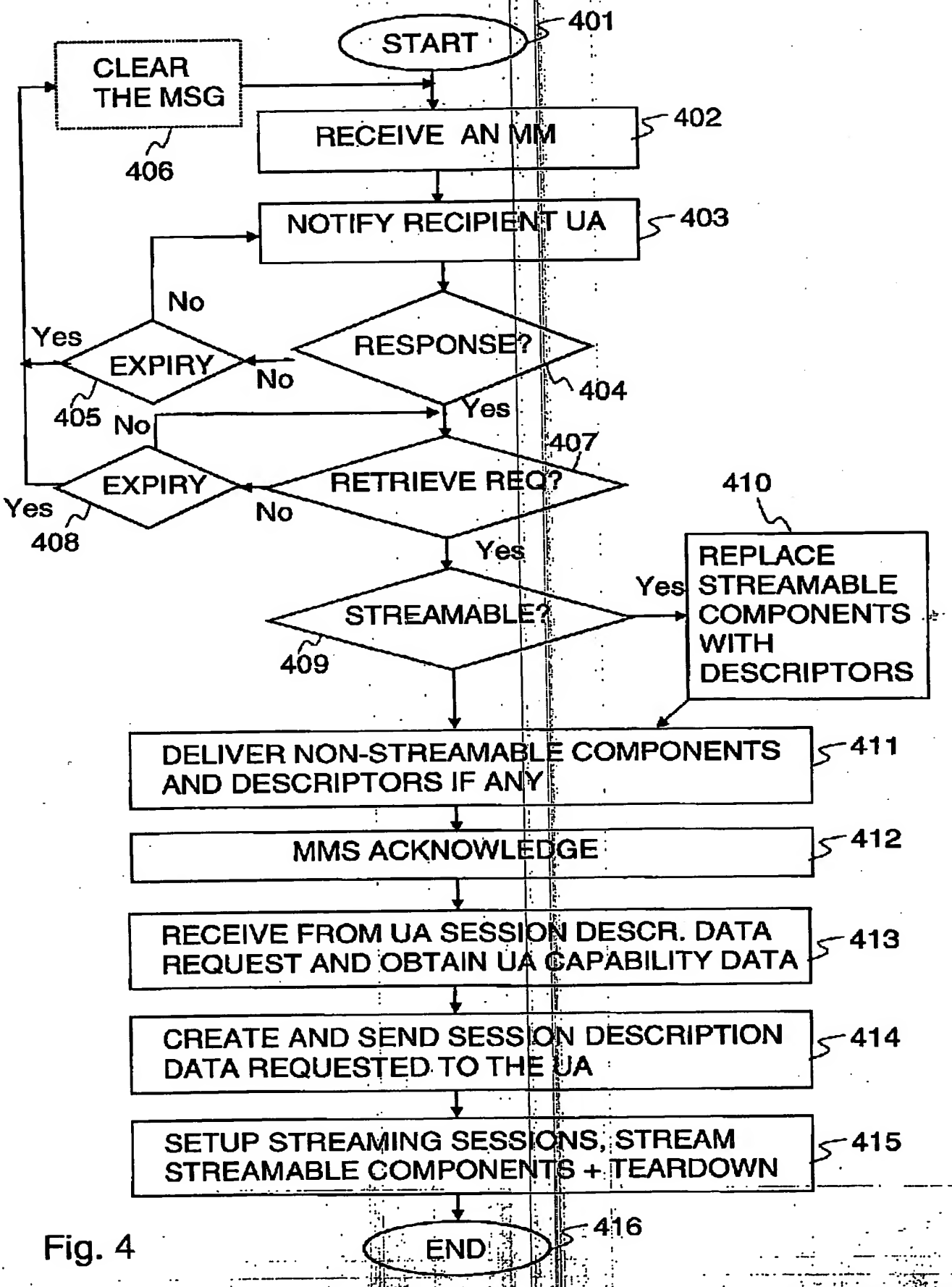
START
401
CLEAR THE MSG
406
RECEIVE AN MM
402
NOTIFY RECIPIENT UA
403
RESPONSE?
404
No
Yes
EXPIRY
405
No
Yes
RETRIEVE REQ?
407
No
Yes
EXPIRY
408
Yes
STREAMABLE?
409
Yes
410
REPLACE STREAMABLE COMPONENTS WITH DESCRIPTORS
DELIVER NON-STREAMABLE COMPONENTS AND DESCRIPTORS IF ANY
411
MMS ACKNOWLEDGE
412
RECEIVE FROM UA SESSION DESCR. DATA REQUEST AND OBTAIN UA CAPABILITY DATA
413
CREATE AND SEND SESSION DESCRIPTION DATA REQUESTED TO THE UA
414
SETUP STREAMING SESSIONS, STREAM STREAMABLE COMPONENTS + TEARDOWN
415
END
416

Fig. 4

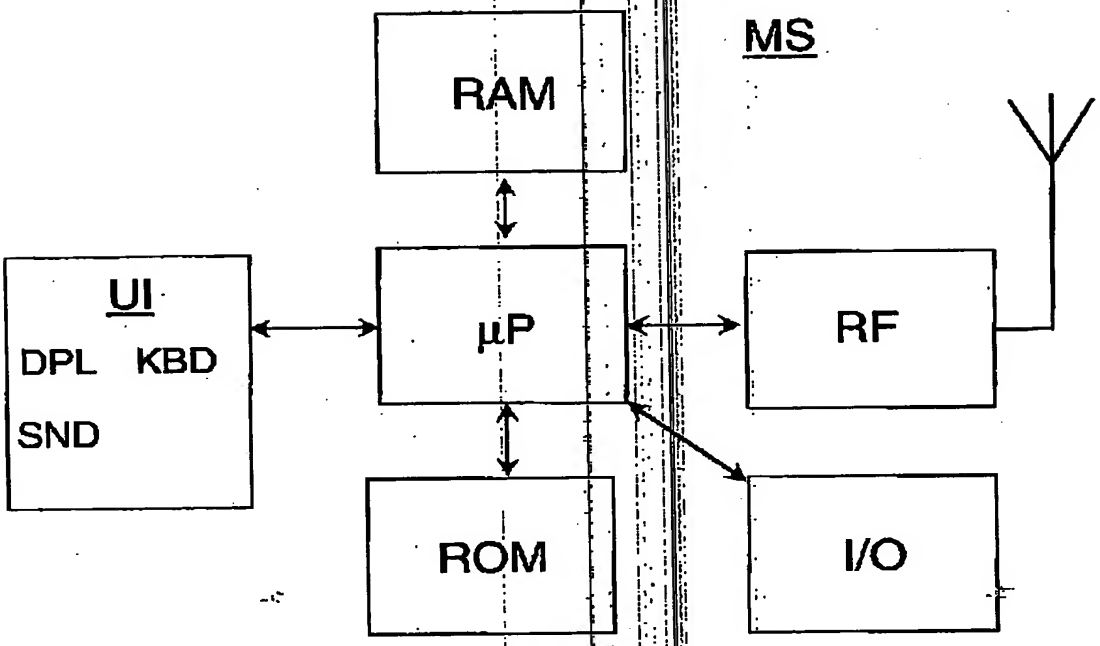

FIG. 5